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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/553,963	10/19/2005	Makoto Ashiura	AOK-0252	9985
23353 7590 03/19/2007 RADER FISHMAN & GRAUER PLLC LION BUILDING 1233 20TH STREET N.W., SUITE 501 WASHINGTON, DC 20036			EXAMINER LEE, RIP A	
			ART UNIT	PAPER NUMBER
			1713	
SHORTENED STATUTORY PERIOD OF RESPONSE		MAIL DATE	DELIVERY MODE	
3 MONTHS		03/19/2007	PAPER	

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

## Office Action Summary

**Application No.**

10/553,963

**Applicant(s)**

ASHIURA ET AL.

**Examiner**

Rip A. Lee

**Art Unit**

1713

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-6 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 10-19-2005.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

### *Claim Rejections - 35 USC § 103*

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. Claims 1-4 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Mano (JP 2002-253703).

Entry 1 of Table 1 of Mano discloses a composition prepared by compounding 100 parts by weight (pw) of high *cis*-polybutadiene (commercially available as BR-11;  $M_n = 100,000$ <sup>1</sup>), 28 pw of zinc acrylate co-crosslinking agent, 18.8 pw of zinc oxide filler, 0.9 pw of dicumyl peroxide crosslinking agent, and 0.5 pw of C<sub>60</sub> fullerene. The ratio of fullerene to diene is about 0.7, which lies well within the recited range of 0.001 to 2.<sup>2</sup> The inventor has discovered that the product (golf ball) using fullerene as filler shows a higher restitution coefficient than that of the comparative example in which diphenyl disulfide is used. While the detailed mechanism is not clear, fullerene is considered to participate in a crosslinked state which results from radical chain reaction (paragraph [0056]). Although Mano does not provide evidence to corroborate this proposal, one having ordinary skill in the art has reasonable basis exists to believe that fullerene is bonded to the diene in the composition of the prior art as indicated by the inventor.<sup>3</sup> Since the PTO can not conduct experiments, the burden of proof is shifted to the Applicants to establish an unobviousness difference. *In re Fitzgerald*, 619 F.2d. 67, 205 USPQ 594 (CCPA 1980). See MPEP § 2112-2112.02. *In re Best*, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977). *In re Spada*, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990).

Regarding claim 4, it is well settled that where product by process claims are rejected over a prior art product that appears to be the same, the burden is shifted to the Applicant to establish an unobviousness difference, even if the production processes are different.<sup>4,5</sup> Furthermore, the patentability of a product claim rests on the product formed, not on the method by which it was produced.<sup>6</sup> As shown above, the prior art product appears the same with regard to the polymer constitution and fullerene content. The only apparent difference is the mode of attachment of fullerene to polymer.

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<sup>1</sup> See Table 1 in Hamada *et al.* (U.S. 5,082,285).

<sup>2</sup> Calculated as: (0.5 g fullerene / 720 g/mole) / (100 g polymer / 100,000 g/mole) = 0.694

<sup>3</sup> Free radical adducts of fullerenes are known in the art; see Brois *et al.* (U.S. 5,462,680).

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<sup>4</sup> *In re Fitzgerald*, 619 F.2d 67, 205 USPQ 594 (CCPA 1980). See MPEP § 2112-2112.02. *In re Best*, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977). *In re Spada*, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990).

<sup>4</sup> *In re Marosi*, 710 F.2d 798, 802, 218 USPQ 289, 292 (Fed. Cir. 1983).

<sup>5</sup> Since it is the patentability of a product claimed, and not of the recited process steps, which must be established, a rejection based alternatively on either section 102 or section 103 of the statute is eminently fair and acceptable in cases where the prior art discloses a produce which reasonably appears to be either identical with or only slightly different than a product claimed in a product-by-process claim. *In re Brown*, 459 F.2d 531, 535, 173 USPQ 685, 688 (CCPA 1972). See also MPEP § 2113.

<sup>6</sup> *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985).

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5. Claims 1-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lukich *et al.* (U.S. 5,750,615).

Lukich *et al.* teaches a rubber composition comprising 100 phr of diene-based elastomer<sup>7</sup> and 30-100 phr of reinforcing filler containing 5-100 wt % of fullerene and 0-95 wt % of carbon black and/or precipitated silica (claim 1). The diene-based elastomer may be a natural or synthetic 1,4-polyisoprene rubber (col. 6, lines 39-42), or copolymer rubber, such as styrene-butadiene rubber having a bound styrene content of 20-45 % (col. 6, lines 53-58). According to one aspect of the invention, fullerenes may have surface modifications such as a functional group substitution to enhance reinforcement properties (col. 2, lines 17-20). To this end, the inventors contemplate incorporation of functional groups such as amine, thiol, and alkanol and reacting a linking moiety to form a resin black matrix within the polymer network (col. 14, lines 23-28). In particular, one skilled in the art may draft [*sic*] hydroxyl groups to the carbon and react with hexamethoxymethyl melamine (col. 2, lines 20-23). Where silica is used, it will contain coupling agent in a ratio of 0.1-0.2/1, relative to silica (col. 8, lines 51-55). These coupling agent are well-known to those of ordinary skill in the art.

The working examples of Lukich *et al.* disclose rubber tire compositions made by physical blending of non-functionalized fullerene and elastomer. There are no examples showing the alternate embodiment of compositions containing functionalized fullerene. However, it would have been obvious to one having ordinary skill in the art to practice this

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particular embodiment because the inventors disclose the synthetic means to achieve this product. It also would have been obvious to one having ordinary skill in the art to use silica/coupling agent because the inventors teach use of this conventional reinforcing filler (col. 8, lines 49-55). Therefore, one having ordinary skill in the art, having read the disclosure of Lukich *et al.*, would have found it obvious to make a composition comprising elastomer, functionalized fullerene, and silica/coupling agent, and thereby arrive at the composition of instant claim 1. The skilled artisan would have been motivated to make this embodiment of the invention because he would have reasonably expected use of hydroxyl-functionalized fullerene to have improved compatibility and dispersibility with the elastomer by virtue of covalent linkage *via* the coupling agent.

The subject matter of claim 2 is obvious over the prior art. One skilled in the art would have found it obvious to arrive at the claimed ratio because Lukich *et al.* teaches use of 30-100 phr of filler per 100 parts of diene-based elastomer, which would place the ratio of fullerene to elastomer well within the claimed range (see previous paragraph for sample calculations). The subject matter of claim 3 is also obvious over Lukich *et al.*, which teaches use of 0.5-4 phr of sulfur vulcanization agent. One having ordinary skill in the tire art would have found it obvious to vulcanize the rubber composition in order to make a tire having sufficient strength. Regarding claims 4-6, it is well settled that where product by process claims are rejected over a prior art product that appears to be the same, the burden is shifted to the Applicant to establish an unobviousness difference, even if the production processes are different.<sup>4,5</sup> Furthermore, the patentability of a product claim rests on the product formed, not on the method by which it was produced.<sup>6</sup> As shown above, the prior art product appears the same with regard to the polymer constitution and fullerene content. The only apparent difference is the mode of attachment of fullerene to polymer.

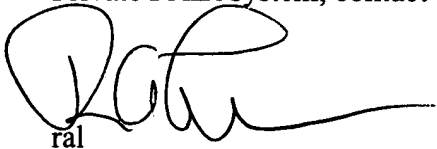
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<sup>7</sup> Diene-based elastomer may be prepared by known methods (col. 7, line 25; 3,4-polyisoprene rubber in Sandstrom *et al.*, U.S. 5,087,668, Table 2, incorporated by reference, has  $M_w$  of 250,000) or purchased commercially (Table 1 of Lukich *et al.* discloses use of Natsyn<sup>®</sup> polyisoprene rubber; for instance, col. 27, line 11 of Yakuta *et al.*, U.S. 3,960,980, discloses Natsyn 2200 having of  $M_w$  398,000). It would have been obvious to one having ordinary skill in the tire art to use a diene-based elastomer having  $M_w$  well over the recited minimum value as the base resin in a tire formulation.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rip A. Lee whose telephone number is (571)272-1104. The examiner can be reached on Monday through Friday from 9:00 AM - 5:00 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu, can be reached at (571)272-1114. The fax phone number for the organization where this application or proceeding is assigned is (571)273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <<http://pair-direct.uspto.gov>>. Should you have questions on the access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll free).



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March 8, 2007